

## CLAIMS

in Patent Application entitled

### ELECTRONIC BALLAST CATHODE HEATING CIRCUIT

- Sub 61
1. An arrangement comprising:
    - a source providing an alternating voltage across a pair of source terminals; the alternating voltage having a fundamental frequency;
    - a series-combination of an inductor and a capacitor; the series-combination being: (i) naturally resonant at or near said fundamental frequency, (ii) effectively connected across the source terminals, thereby to draw a source current from the source terminals, and (iii) connected in circuit with a pair of output terminals across which is provided an output voltage; the inductor means being coupled with an auxiliary winding, thereby to cause an auxiliary voltage to be provided from this auxiliary winding; and
    - a gas discharge lamp means having a pair of cathode terminals connected with the auxiliary winding by way of a connect means.
  2. The arrangement of claim 1 wherein the coupling between the inductor and the auxiliary winding is sufficiently loose so that, in case an electrical short circuit were to be placed across the auxiliary winding, the magnitude of the source current would be prevented from increasing to a detrimentally high level.
  3. The arrangement of claim 1 wherein the coupling between the inductor and the auxiliary winding is sufficiently loose so that, in case an electrical short circuit were to be placed across the auxiliary winding, the inductance represented by the inductor would not decrease by more than half.
  4. The arrangement of claim 1 wherein the connect means includes resistor means.
  5. The arrangement of claim 4 wherein the resistor means is a non-linear resistor means.
  6. The arrangement of claim 4 wherein the resistor means includes an incandescent filament means.

7. The arrangement of claim 1 wherein the connect means includes limiting means operative to manifestly limit to a pre-established level the magnitude of any current drawn from the auxiliary winding.

8. The arrangement of claim 1 wherein the source includes frequency-converting power supply means operative to be powered from the power line voltage of an ordinary electric utility power line and to provide said alternating voltage; the fundamental frequency of the alternating voltage being substantially higher than that of the power line voltage.

9. The arrangement of claim 1 wherein the magnitude of the source current is an inverse function of the magnitude of the inductance of the inductor.

10. The arrangement of claim 1 wherein the series-combination is naturally resonant at a frequency lower than said fundamental frequency.

11. An arrangement comprising:

a source of power line voltage;  
rectifier means connected with the source and operative to provide a DC voltage at a set of DC terminals;  
inverter means connected with the DC terminals and operative to provide an AC voltage across a pair of inverter terminals;

an LC circuit having a tank inductor connected with a tank capacitor; the LC circuit being: (i) connected in circuit with the inverter terminals, (ii) tuned to natural resonance at a frequency lower than the fundamental frequency of the AC voltage, (iii) operative to draw an inverter current from the inverter terminals, and (iv) connected in circuit with a pair of output terminals across which is provided an output voltage; the inductor means having a main winding and an auxiliary winding coupled therewith; and auxiliary voltage being provided by the auxiliary winding; and

a gas discharge lamp means having a pair of cathode terminals connected with the auxiliary winding.

12. The arrangement of claim 11 wherein the main winding: (i) has an inductance of a first magnitude when measured at times when no current is flowing in the auxiliary winding; (ii) has an inductance of a second magnitude when a short circuit is present across the auxiliary winding; and (iii) the second magnitude is at least half of the first magnitude.

13. ~~An arrangement comprising:~~  
a gas discharge lamp having a pair of cathode terminals;  
a source providing a cathode heating voltage at a pair  
of source terminals; and  
connect means operative to connect the cathode terminals  
with the source terminals such as to cause a cathode heating  
current to flow between the cathode terminals; the connect means  
including current-limiting impedance means; at least part of  
the cathode heating current flowing through the current-limiting  
impedance means.
14. The arrangement of claim 13 wherein the current-limiting  
impedance means is connected in series between the source  
terminals and the cathode terminals.
15. The arrangement of claim 13 wherein the current-limiting  
impedance means includes a non-linear impedance means.
16. The arrangement of claim 13 wherein the current-limiting  
impedance means includes an incandescing filament.
17. The arrangement of claim 13 wherein the current-limiting  
impedance means has an impedance that increases monotonically  
with the magnitude of any current flowing through it.
18. The arrangement of claim 13 wherein the current-limiting  
impedance means includes an incandescent lamp.
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